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ABSTRACT

Responses of first-grade students, parents, and teachers in elementary schools in one school district to the "Writing to Read" (WTR) program were assessed for a version of the program implemented in mid-sized suburban schools. The WTR program is an IBM computer-based instructional system designed to develop the writing and reading skills of kindergarten and first-grade students. The study also compared the results of a standardized test, the Comprehensive Test of Basic Skills (CTBS), for reading and language between WTR students and non-WTR students. The CTBS is routinely administered to second graders in the subject school district. Three of the nine elementary schools in the district were involved in the 1986-87 and 1987-88 WTR program, and two other schools were added during the 1988-89 school year. Data for 548 students (264 males and 284 females) in 1988-89 are provided. In addition to CTBS data, results were obtained from Competency Based Writing Samples, rated by teachers based on critical skills specifications. Results indicate that in the areas of word attack, vocabulary, reading comprehension, and spelling, WTR students outperformed non-WTR students. Further examination indicated differences in achievement based on sex for WTR as well as non-WTR students. Five data tables are included. (TJH)

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RESULTS OF A MULTI-YEAR FORMATIVE
EVALUATION FOR THE WRITING TO READ PROGRAM
IN A MID-SIZE SUBURBAN SCHOOL DISTRICT

AERA

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Overview and Objectives

The Writing to Read program is an IBM computer based instructional system designed to develop the writing and reading skills of kindergarten and first grade students. The Writing to Read software and other support materials help students work through sequenced, self-paced word cycles designed to teach letter-sound relationships. The objectives for this study are as follows: (1) to determine responses of the first grade students to the Writing to Read (WTR) program; (2) to evaluate the responses of parents of WTR students; (3) to collect the responses of WTR teachers about the implementation of the WTR program; (4) to compare the results of second grade students who had WTR with second grade students who did not have Write to Read (NWTR) on the Comprehensive Test of Basic Skills (CTBS) for the reading and language arts subtests; and (5) to compare the results on the school district's Competency Based Writing Samples for first and second grade WTR and NWTR students.

Perspective

Qualitative and quantitative measures are the focus of this formative program evaluation. This study presents a unique chance to examine the responses of students, parents, and teachers to the implementation of the WTR program in a mid-size suburban school as well as to compare the results of a standardized test, CTBS for reading and language, between WTR students and NWTR students within the same district. A comparison of a Competency Based Writing Sample between WTR and NWTR students within the district also helps to determine the results of the formative evaluation for this program.

Methods and Data Sources

There were five areas for the formative evaluation of the WTR program. Three of the nine elementary schools in the district were involved in the 1986-1987 and the 1987-1988 implementation of the WTR program. Another two schools were added during the 1988-1989 school year. The formative qualitative focus of the first three areas was on: (1) responses of the first grade students in the WTR program; (2) responses of the parents to the WTR program; and (3) comments by the implementing WTR first classroom teachers.

The CTBS is given to second grade students in this district. The test is designed to measure achievement in basic skill areas of reading, language, and mathematics. The test series combines the most useful characteristics of norm referenced and criterion referenced tests, providing information about the instructional needs of the students. For second grade students, the CTBS

areas for reading and language are as follows: (1) word attack; (2) vocabulary; (3) reading comprehension; (4) reading total; (5) spelling; (6) language mechanics; (7) language expression; and (8) language total. The second part of the CTBS is the Test of Cognitive Skills. This is an ability test designed to assess the level of aptitude attained by students. Some abilities cannot be measures directly so behaviors are assessed that reflect these abilities. In this section of the CTBS the series of subtests on thinking skills are related to success in an educational program. The Cognitive Skills Index (CSI) represents the composite score for these measures of thinking ability. The CSI is an age-based standard score that describes student performance on the CTBS. This score indicates a student's overall cognitive ability or academic aptitude as compared to students with a similar chronological age without regard to grade placement. The CSI score is used as the covariant in the Analysis of the Covariance so that valid comparisons could be made between the scores of **WTR** and **NWTR** students were compared. Five hundred and eighty-four second grade students were used in the CTBS analysis for the **WTR** and **NWTR** participants.

Competency Based Writing Samples are collected from first and second grade students in both **WTR** and **NWTR** classrooms. The writing sample is a part of the critical skill analysis for each grade in this school district. The teachers rate these samples based on the information listed in the critical skills specifications. The score range for these samples is from 0 to 3 for first grade students and 0 to 4 for second grade students. An analysis of the results of the rating comparisons is made on the basis of **WTR** participation and also by the gender of the students. The average number of words for the writing samples is compared by **WTR** participation and gender. Over one thousand writing samples were used in this comparison for the first and second grade students.

Results

The first grade **WTR** students preferred the Writing Table station to the other five stations. The majority were open ended responses from the first graders were positive about the **WTR** program. The parental responses to the **WTR** program were very positive. Statements from the implementing teachers centered around readiness and developmental issues.

CTBS Comparisons

In comparing the CTBS achievement scores between the group of second grades who participated in **WTR** as first graders and a second group of second grades who did not participate in it as first graders, the CSI score was held constant when the Analysis of Variance (ANOVA) was used to examine the differences between these two student groups. Using the CSI score as a covariant means that the ability of the students was not a factor when the differences in the subtests

on the CTBS achievement sections were compared between the **WTR** and the **NWTR** second grade students.

TABLE 1 provides the information about the **WTR** and **NWTR** students in terms of means, standard deviations, and medians for each of the CTBS subtests taken by the second graders.

TABLE 1

**Comprehensive Test of Basic Skills Analyzed by Second Grade
WTR and NWTR Groups 1988-1989**

Male **WTR** Students = 100
Male **NWTR** Students = 164
Total Male Students = 264

Female **WTR** Students = 104
Female **NWTR** Students = 180
Total Female Students = 284

Number of **WTR** Students = 204
Number of **NWTR** Student = 344
Total Number of Students = 548

Area	Mean		Standard Deviation	
	WTR	NWTR	WTR	NWTR
Word Attack	76.85	70.30	18.05	22.04
Vocabulary	75.12	68.92	21.60	25.26
Reading Comprehension	74.79	68.99	21.87	24.24
Reading Total	75.83	69.62	21.85	24.96
Spelling	62.23	56.93	20.18	21.52
Language Mechanics	73.12	68.66	21.28	21.43
Language Expression	67.94	65.47	20.67	23.17
Language Total	71.85	68.11	20.58	21.92

In **TABLE 2**, the results of the Analysis of Covariance (ANCOVA) comparing **WTR** and **NWTR** students are presented with the CSI as a covariant or constant so the cognitive ability of the students was not a factor in examining the differences between **WTR** and **NWTR** groups. The column labeled "Level of Significance for F Ratio" indicates if the differences between **WTR** and **NWTR** groups is not due to chance, i.e. there is an actual difference between the scores of these groups that reflects actual achievement differences between these groups. In this case it is hypothesized that the actual differences between these groups are due to the experiences that the **WTR** students had in Writing to Read that the **NWTR** students did not have. The level of significance selected for this study is 0.05, indicating that in 95% of the cases the differences

observed between the two groups were due to the Writing to Read experience rather than due to chance.

TABLE 2
Analysis of Covariance for the CTBS
CSI in the Covariant Held Constant

Total Number of Students = 548

Total **WTR** Students = 204

Total **NWTR** Students = 344

Area of Comparison	Level of Significance for F Ratio	Significant at 0.05 level or less
Word Attack	0.010	Yes
Vocabulary	0.014	Yes
Reading Comprehension	0.020	Yes
Reading Totals	0.014	Yes
Spelling	0.015	Yes
Language Mechanics	0.067	No
Language Expression	0.545	No
Language Total	0.177	No

To solidify the meaning of the importance of statistical significance, the means for each of the CTBS subtests must be examined as presented in TABLE 1. In all subtests the mean scores for the **WTR** students were higher than the mean scored for the **NWTR** students. There was a statistically significant difference found between the two groups for the following subtests: Word Attack; Vocabulary; Reading Comprehension; and Spelling. The Language Mechanics subtest did not show a significant difference between the **WTR** and **NWTR** students.

Further examination of the comparisons between the **WTR** and **NWTR** groups produced the differences in achievement on the CTBS achievement battery based on sex difference in the two groups of second graders. In TABLE 3 these differences are presented.

TABLE 3

Analysis of Covariance for CTBS
CSI is the Covariant Held Constant
Results Presented for Males & Females

Areas of Comparison	Level of Significance of F Ratio for WTR/NWTR & Males and Females	Significance at 0.05 Level or Less
Word Attack	0.001	Yes
Vocabulary	0.014	Yes
Reading Comprehension	0.200	No
Reading Totals	0.014	Yes
Spelling	0.015	Yes
Language Mechanics	0.062	No
Language Expression	0.535	No
Language Totals	0.168	No

Comparing the results of the 1987-1988 CTBS Writing to Read analysis to the analysis in this report indicates that some of the differences between **WTR** and **NWTR** still existed in the 1988-1989 group of second grades. In the Word Attack, Vocabulary, Reading Comprehension, and spelling areas of the CTBS, second graders in 1987-1988 and 1988-1989 showed significant differences in the **WTR** and **NWTR** groups. In all cases the **WTR** mean was higher than the **NWTR** mean for these subtests on the CTBS.

In the 1987-1988 school year the Reading Total did not represent a significant difference between **WTR** and **NWTR** second grade students; however, in the 1988-1989 school year there was a significant difference between the **WTR/NWTR** subgroups. Significant differences between **WTR** and **NWTR** 1987-1988 second grade students were found in Language Mechanics, Language Expression, and Language Totals while in the 1987-1988 second grade group these differences were not significant between **WTR** and **NWTR** students.

In terms of differences between the males and females in **WTR** and **NWTR** program and scores on the CTBS the following subtests indicated a **WTR** and sex interaction, i.e. **WTR** males and females scored higher than **NWTR** males and females for the 1988-1989 group of second grade students. The 1988-1989 CTBS Areas where **WTR/NWTR** and sex differences were statistically significantly differences are: Word Attack; Vocabulary; Reading Totals; and Spelling.

In these four subtests male **WTR** students' scores were higher than male **NWTR** scores and the differences were statistically significant at the 0.005 level.

Comparing the 1988-1989 second grade CTBS results to the 1987-1988 results indicated the sex differences within **WTR** and **NWTR** groups were continuous for both years in: Word Attack; Vocabulary; and Spelling.

Average Rating and Word Comparisons on the Competency Based Writing Samples

Competency Based Writing samples were collected from first grade and second grade students at the end of the 1988-1989 school year. Competency Based Writings sample, is part of the critical skill analysis for each of the grade levels. The teachers give these writing samples a rating based on information listed in the specification for the critical skills. For example, Critical Skills #2 for first grade students is stated as follows:

CRITICAL SKILLS #2: Given a picture and list of words about the picture developed during class discussion, the student will write at least two sentences about the picture and attain a score of at least 2 using the same scoring guide provided.

SCORING GUIDE: There is no set story line that the student's writing sample should depict. It is not important whether the stories are realistic or fanciful. Important criteria are that the story shows and understanding of the picture by the child or a description of the picture.

There are four possible scores ranging from 0 to 3 for first grade students and 0 to 4 for second grade students.

SCORE of 0: An illegible paper; a blank paper; a paper on a completely different topic.

SCORE of 1: A single statement about the picture; a paper with confused, nearly unintelligible story.

SCORE of 2: A paper with at least two sentences related to the picture or to the understanding of the picture; a paper with at least two sentences in a sensible order; a paper with at least two sentences describing the picture.

SCORE of 3: A paper with all the qualities of a "2" paper, but with more imaginative thoughts and vocabulary; a paper with more than descriptive sentences about the picture.

Teachers are given example items to use in scoring. The ratings for these papers were done by the first and second grade teachers. In addition to the ratings done by teachers, a word count per sample was completed. The result for the rating and word count are presented in TABLE 5. The results of the rating comparison was made using the Analysis of Variance (ANOVA), for all the samples broken down by grade. There was a significant difference between the **WTR** group and the **NWTR** group on the average rating and the average number of words for the writing samples. An alpha level of 0.05 was used throughout the study to determine the cut off for statistical significance.

TABLE 4
Average Rating for the Competency Based Writing
Sample Analyzed By Sex for the 1988-1989 School Year

Grade	Mean WTR Total	Mean NWTR Total	Mean WTR Male	Mean NWTR Male	Mean WTR Female	Mean NWTR Female
<u>First</u>						
	N = 423	N = 204	N = 213	N = 96	N = 210	N = 108
	--	--	--	--	--	--
	X = 2.24	X = 2.22	X = 2.23	X = 1.97	X = 2.26	X = 2.14
<u>Second</u>						
	N = 204	N = 344	N = 100	N = 164	N = 104	N = 180
	--	--	--	--	--	--
	X = 3.43	X = 3.27	X = 3.39	X = 3.27	X = 3.47	X = 3.27

In TABLE 5 the results of the average word count for the Competency Based Writing sample is examined by male and female categories in addition to the grade and year categories. For first grade **WTR** and **NWTR** students the rating comparisons between the average rating for the Competency Base Writing sample using ANOVA (Analysis of the Variance) was not significant at the 0.05 level. The average word production for the Competence Based Writing sample average rating for first grade students also showed a significant difference (0.008) when related to the sex of the students **WTR** and **NWTR** groups. In this case the average Competency Based Writing sample rating of **WTR** males was 2.23 while **NWTR** males had a mean of 1.97.

TABLE 5

**Average Rating for the Competency Based Writing
Sample Analyzed By Sex for the 1988-1989 School Year**

Grade	Mean WTR Total	Mean NWTR Total	Mean WTR Male	Mean NWTR Male	Mean WTR Female	Mean NWTR Female
<u>First</u>						
	N = 433	N = 204	N = 213	N = 96	N = 210	N = 108
	$\bar{X} = 34.17$	$\bar{X} = 24.75$	$\bar{X} = 32.72$	$\bar{X} = 21.08$	$\bar{X} = 35.64$	$\bar{X} = 28.01$
<u>Second</u>						
	N = 204	N = 334	N = 100	N = 334	N = 104	N = 180
	$\bar{X} = 65.82$	$\bar{X} = 57.08$	$\bar{X} = 61.64$	$\bar{X} = 49.27$	$\bar{X} = 70.01$	$\bar{X} = 64.14$

The average number of words produced by first grade students showed a significant difference related to the sex of the students in **WTR** and **NWTR**. The average number of number of words produced by **WTR** males was 32.72 words while the **NWTR** males had a mean of 21.08 words. **WTR** females produced an average of 35.64 words while the **NWTR** females had a 28.01 word average.

For second graders, **WTR** compared to **NWTR**, the rating comparisons between average ratings for the Competency Based Writing samples ANOVA was statistically significant. The average word production For the Competency Based Writing sample using ANOVA was also statistically significant when the **WTR** and **NWTR** students were compared. The Competency Based Writing sample average rating for second graders did not show a significant difference related to sex of the students in **WTR** and **NWTR** program. However, the average number of words produced by second graders showed a statistically significant difference when related to the sex of the students in **WTR** and **NWTR** groups. The average number of words produced by **WTR** males was 61.46 words while **NWTR** males had a mean of 49.72 words. **WTR** females produced 70.01 words or an average, while **NWTR** females produced an average of 64.19 words.

Importance of the Study

Several issues were raised as the result of this study. In addition to the formative evaluation results that are linked to continuation and expansion of the **WTR** program in this district, the continuation of the benefits of the Writing to Read program was seen through the evaluation of the **WTR** and **NWTR** students' results on the second grade CTBS testing. The gender differences between the male and female **WTR** students as compared with the male and female results for **NWTR** students, indicates an area for further examination.

Currently, longitudinal data is being collected on fourth grade students who took the CTBS test during the 1988-1989 school year. These fourth graders have taken the CTBS test during the 1990-1991 school year. The CTBS results for these **WTR** and **NWTR** students will be compared to see if the subtest differences have persisted over a two year period.